American Institute of Aeronautics and Astronautics

AIAA-Houston Section Congressional Visits Day

April 7 & 8, 2003

Houston Section *P.O. Box 57524 Webster, Texas 77598*

AIAA Vision & Mission Statement

***AIAA* is the world's leading professional society in the broad areas of aeronautics and astronautics, and the preeminent worldwide aerospace information source**

- ***The Purpose of the Institute is:***
  - ***to advance the arts, sciences, and technology of aeronautics and astronautics and***
  - ***to nurture and promote the professionalism of those engaged in these pursuits***

- ***Houston Section***
  - ***Approximately 800 members***
  - ***Primary focus on space systems and applications***

COLUMBIA AND THE FUTURE

- **<u>Summary</u>: The heroes of Space Shuttle Columbia deserve to have the cause of their tragedy identified through the most exhaustive analysis possible, then return to flight**
  - The tragedy overshadows all other aerospace issues this year, and safe return to flight is paramount for NASA
  - The Space Shuttle is critical for station construction and resupply - especially for water resources. Water requirements will even likely force a two man contingency crew for several months including dependence on Russian vehicles. There are no other viable near-term alternatives.
- **<u>Recommendations</u>: Use all necessary resources to determine cause of tragedy and enable Shuttle return to flight**
  - Review committee needs support to achieve thoroughness with all possible speed, since time is of the essence with respect to Space Station needs
  - After return to flight, identify whatever near-term reasonably priced Shuttle safety upgrades can be made and make them
  - Expend mid- and longer-term resources to achieve Shuttle replacement / alternate space transportation, such as Space Launch Initiative (SLI) or Orbital Space Plane programs

INTERNATIONAL SPACE STATION

- **<u>Summary</u>: Space Station is working remarkably well, but important issues remain**
  - Largest International engineering project undertaken to date; very few problems so far
  - The Space Station is meant to be a scientific research facility and a 3-person crew is needed for upkeep alone, so little or no research can be accomplished. A habitation module and other crew adaptations MUST be made to support this research before assembly complete of the Space Station.
  - Assured crew return method for a 7-person crew MUST be available to support research goals
- **<u>Recommendations</u>: Continue our commitments to our International Partners to complete the Space Station project**
  - With the recent events the U.S. is keenly aware of the International community's perception of our policies and our leadership role in space
  - To date we have maintained a smooth working relationship with our International Partners, and we want to continue this progress

HUMAN SPACEFLIGHT

- **<u>Summary</u>: Human Spaceflight is undergoing massive review to determine its role in the future of space exploration**
  - As stated in previous slide, undertake appropriate shuttle safety upgrades for near term
  - Fully fund shuttle replacement undertaking, and do NOT underestimate magnitude and cost of buying down the technology risk. Dare to risk innovative concepts from whatever sources.
  - Consider whole manned enterprise, and use this energy to refocus on potential new options
- **<u>Recommendations</u>: Seize this period of review to refocus NASA to consider bold new mission mandates for visionary manned objectives**
  - Refocus NASA on the agency's true goals and future agenda
  - A rededication to manned discovery and utilization of Moon and Mars would promote new technology development
  - Dare to be innovative and expand our reach into nearby solar system areas, such as Libration Point (L1 Gateway) and Manned Mission to Outer Planets (MOP)
  - Look for any opportunity to expand the commercial space tourism endeavor. The excitement is building and helps the public understand their potential role in space.
  - Remove the ban on advertising for space launch products of all kinds to help offset launch costs

WORKFORCE ISSUES

- **<u>Issue:</u> The future security and economic growth of the US depends on an increasing number of qualified scientists, engineers, and information technology experts**
  - The **average age** of engineers and scientists in professional aerospace engineering is now approaching **<u>57</u> <u>years</u>**. Twice as many workers over 60 years old than under 30 years old.
  - 60% of future jobs will require skill sets that only 20% of population possesses
  - If not reversed soon, this will have wide-ranging effects in national, economic, and homeland security
- **<u>Recommendation:</u> Provide federal government incentives for more students to pursue careers in math, science, and engineering**
  - Increase the interest of key personnel recruitment and retention through the funding of cutting edge projects, like Moon/Mars outposts, HEDS, and bold new projects to open space frontier
  - AIAA proposes legislation to establish a National Science and Technology Corps, where part or all of tuition in science or engineering field is government sponsored, in return for service to government or teaching science or math in underserved areas

NATIONAL AEROSPACE RESEARCH & TECHNOLOGY PLAN

- **<u>Issue</u>: Declining federal investment in civil aviation research and technology directly and adversely affects national security, balance of trade, national leadership, market share, jobs and engineering competence**
  - US Aerospace exports are the largest single item on positive export list (~$30B, with net positive ~$24B)
  - US aviation and space industry challenges must be faced with new technology and new concepts that evolve from high-risk, long-term research
  - Return-on-investment time spans longer than the commercial sector can generally accept
  - The European Union's strategy report "European Aeronautics: A Vision for 2020" outlines a strategy to "win two great prizes: global leadership in the development and sale of airframes, engines and avionics equipment, and a world-class air transportation system"
- **<u>Recommendation</u>: Reverse decline in funding and develop the will to enhance US leadership, and support comprehensive plan to carry it though**
  - Must address both critical milestones and essential funding
  - Continue the government role as a sponsor of means for reduced-cost and improved access to space and civil aviation research, especially university forums

HOUSTON SECTION ACTIVITIES

- **World Space Congress & Committee on Space Research**
  - October 2002 held in Houston, Texas
  - Over 13,000 attendees from all over the world
  - The Houston Section was a major contributor to the planning and execution of this event
- **Region IV Student Paper Conference**
  - Approximately 53 students from Region IV includes TX, NM, LA, and OK; presenting undergraduate and graduate technical papers
  - April 3-5, 2003 at the University of Houston
  - Exceptional opportunity for students to grow professionally
- **Numerous Education Outreach Programs**
  - "Physics is Fun"
  - Houston Science & Engineering Fair
  - FIRST Robotics
  - Mars Settlement Design Competition
- **Monthly Activities Sponsored by the Houston Section**
- **Activities/Coordination with the Clear Lake Area Economic Development Foundation (CLAEDF)**

SUMMARY

We welcome your continued support for NASA!

Thank you, for the opportunity to share our thoughts with you.

Let us in the Houston section be a resource for you on any and all Aerospace issues!

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ACCESS TO SPACE

- **<u>Issue:</u> Future expansion of government and commercial activity in space depends upon major access-to-space cost reductions and operational improvements**

- **<u>Recommendation:</u> Continue the government role as a sponsor of means for reduced-cost and improved access to space**
  - Safety investments must be made in the Space Shuttle program to ensure a healthy fleet until an alternative vehicle is available
  - Pursue clear space-access-technology-development milestones that lead to major operational improvements and cost reductions
  - AIAA endorses recent changes in the NASA Space Launch Initiative and developing Department of Defense access-to-space technology investment plans under the National Aerospace Initiative

TECHNOLOGY VALIDATION & VERIFICATION

- **<u>Issue:</u> Numerous government agencies apply research and development (R&D) resources to develop technologies to a proof-of-concept level.**
  - Few government agencies invest in carrying technologies through a validation and verification (V&V) program once they have been brought to the proof-of-concept level
- **<u>Recommendation:</u> Obligate agencies granted resources for technology development and associated proof-of-concept demonstration investment to allocate a portion of the resources to dedicated V&V of the technologies deemed most promising following proof-of-concept tests**
  - Analogous to the SBIR Phase II program

HOMELAND SECURITY

- **<u>Issue:</u> The creation and implementation of the Department of Homeland Security is a monumental undertaking**
  - The aerospace industry possesses unique capabilities, talents, and systems which can be brought to bear on the technical challenges facing the new department
- **<u>Recommendation:</u> Initiate a comprehensive review of requirements established by the Department to-date and conduct a mapping of aerospace-related technologies for further review and vetting**
  - The space industry produces many enabling technologies. Such technologies are generally 10 to 15 years ahead of the market and could be of great benefit to the Department of Homeland Security